REMARKS

Claims 1-7 are pending in the application.

Claims 1 and 2 have been amended in order to more particularly point out, and distinctly claim the subject matter to which the Applicants regard as their invention.

Minor amendments have been made to the specification to correct spelling errors.

Claims 1-7 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention (Office action paragraph 2).

The Examiner states that it is unclear whether the layer having the change in surface gloss claimed is part of the release layer as it is described or a "layer on which the three-dimensional pattern is formed" while the release sheet already contains "a curable resin on which a three-dimensional pattern ... is formed."

The rejection is overcome by the amendment to claims 1 and 2.

First of all, the amendment to claim 1 clarifies that the "continuous release sheet" of line 3 of the claim, the "another continuous release sheet" of line 5, and the "other continuous sheet" of line 6 are all **continuous** sheets. Secondly, claim 1 is amended in lines 13-14 to clarify that "the continuous release sheet comprises a curable resin on which ~~a~~ said three-dimensional pattern having the optical functions is formed before said extruding step". That is, the three-dimensional pattern referred to in these lines is the three-dimensional pattern of lines 3-4 of the claim, and it is the layer on which this three-dimensional pattern is formed that is the subject of the change in surface gloss

recitation of the last five lines of the claim.

Claim 2 is similarly amended. The amendment to claim 2, lines 15-16, reads "a change in a surface-gloss of a layer, on which the three-dimensional pattern is formed, of the composite release sheet ...", clarifying that the layer is of the composite release sheet.

Claims 1 and 3(1)-5(1) are rejected under 35 U.S.C. §103(a) as being unpatentable over Kawaguchi et al. (U.S. Patent No. 5,885,490) (Office action paragraph 4).

The rejection of claims 1 and 3-5 is respectfully traversed.

In traversing the rejection, Applicants note the following points comparing the present invention to the cited references.

The present invention is characterized by a continuous release sheet of a curable resin satisfying (a) transcriptional properties (heat resistance in the specific test conditions) and

(b) mechanical properties (windability in a form of cylinder of the specific inches in diameter).

That is, as shown in Table 1 (page 25) of the present specification, in the case of a thermoplastic release sheet (A) as a comparative example, the rate of change in gloss in the surface heat resistance test is as large as 21.7%; in contrast, in the cases of a curable resin release sheet (B) and a composite release sheet (C), both as examples of the present invention, said rates of change in gloss are remarkably small: 5.4% and 1.5%, respectively.

Moreover, with respect to qualities of the optical sheets obtained by extruding at 310° C by the use of the above three release sheets, in the case of the optical sheet obtained by the thermoplastic

release sheet (A), the sectional configuration of a base portion of a prism is greatly curved, while in the curable resin release sheet (B) and the composite release sheet (C), apex angles are indicated.

It is understood from the foregoing that a thermoplastic release sheet is limited with respect to processing (temperature) range and thus is inferior in transcriptional ability as compared with a curable resin release sheet (page 26, lines 1 to 9 in the present specification).

With specific regard to the rejection, Kawaguchi et al. is concerned with a method for producing a continuous sheet having an optical function by the use of a **thermoplastic release sheet**.

The thermoplastic release sheet, however, involves a drawback that it is limited with respect to processing (temperature) range and is inferior in transcriptional ability, while the present invention has been completed in order to eliminate such a drawback of Kawaguchi et al. by employing a release sheet of a **curable resin or a composite release sheet comprising a substrate and a release sheet of a curable resin**, as mentioned above.

The superiority of the release sheet of a curable resin and the composite release sheet of the present invention to a release sheet of a thermoplastic resin is apparent from the above arguments.

Meanwhile, Kawaguchi et al. refers to a release sheet of a composition curable by heat or light being embossed by the use of a release sheet (Col. 3, lines 45-48).

However, the above teachings are only general and an addition to the thermoplastic release sheet at which Kawaguchi et al. aims. Moreover, no examples of a release sheet of a curable resin are shown.

As stated above, Kawaguchi et al. completely fails to suggest or contemplate two

requirements: (a) transcriptional properties and (b) mechanical properties (windability), which are requisites for carrying out the present invention industrially.

It is needless to say that the above two requirements (a) and (b) cannot be derived with ease even to one having an ordinary skill in the art from Kawaguchi et al. which only generally and additionally refers to a release sheet of a curable resin, In other words, the present invention improves Kawaguchi et al. by finding out the requirements (a) and (b) which ensure industrial practice.

To further support the arguments, Applicants have attached a Declaration under 37 CFR 1.132, by Takumi KOSUGI. In the Declaration submitted herewith, several comparative examples are presented to demonstrate how the above two requirements (a) and (b) are important and indispensable to carry out the present invention industrially.

As stated above, claims 1 and 3(1) - 5(1) are novel and non-obvious over Kawaguchi et al.

Claims 2, 3(2)-5(2) and 6 are rejected under 35 U.S.C. §103(a) as being unpatentable over Kawaguchi et al. as applied to claim 1 above, and further in view of Gray, III et al. (U.S. Patent No. 4,322,450) (Office action paragraph 5).

The rejection of claims 2, 3(2)-5(2) and 6 is respectfully traversed.

Gray III et al discloses a method of providing surface replication in a release coating on a substrate. The reference, in col. 3, lines 67-68, mentions: "it enables replication of very fine patterns in the release paper such as wood grain and leather grain." The reference, in col. 4, lines 16-21,

mentions: "The critical elements of the invention which provide this advantage are coating the electron beam curable composition directly to substrate, the substrate having the proper porosity, and permitting sufficient time between coating and curing to permit the coating to penetrate the substrate".

In contrast, the present invention is directed to optical usage, and thus it is mentioned on page 13, lines 5-8, in the present specification: "The substrate is required not to contract or deform in the following extrusion lamination of a thermoplastic resin and not to affect the formation of a three-dimensional pattern due to the unevenness on its surface, and a synthetic resin or a metallic foil is suitable." Accordingly, the substrate in Gray III et al. cannot be used in the present invention.

Moreover, in Gray III et al. the replicative surface is provided to coating of an electron beam radiation curable composition by roll 22 in which the desired texture is engraved, not by the coated paper, while in the present invention the three-dimensional pattern is provided to a thermoplastic resin by the (composite) release sheet of a curable resin.

Further, it is nowhere described in Gray III et al. that the coated paper stripped from the replicative surface (partially cured coating) or a composite comprising the coated paper and a coating of a curable resin (before stripping) is used as a release sheet or a composite release sheet for transferring a pattern at the extrusion of molten thermoplastic resin.

Therefore, the present invention and Gray III et al. are essentially different from each other in respect of object, construction and effects so that the coated paper or a composite of a coated paper and a coating used in Gray III et al. can not be applicable to the present invention. At the same

time, such coated paper and composite cannot be used in Kawaguchi's process, either, for the same reasons as above.

Therefore, claims 2, 3(2) - 5(2) and 6 are novel and non-obvious over Kawaguchi et al. in view of Gray III et al.

Claim 7 is rejected under 35 U.S.C. §103(a) as being unpatentable over Kawaguchi et al. and Gray, III et al. as applied to claim 2 above, and further in view of Kanki et al. (U.S. Patent No. 6,040,356) (Office action paragraph 6).

The rejection of claim 7 is respectfully traversed.

Kanki et al. discloses a transfer sheet comprising a base sheet having release properties and a pattern transfer layer provided on a surface of said base sheet, said pattern transfer layer being formed from a durable gravure ink.

The present invention and Kanki et al. are essentially different from each other in the following respects:

(a) Kanki et al. is directed to a decorative material such as a floor surface or a wall surface (col. 1, line 6), while the present invention is directed to a continuous sheet for optical usage.

(b) In Kanki et al., a pattern transfer layer formed from a durable gravure ink on a base sheet is transferred to a body having a surface, while in the present invention, a three-dimensional pattern having optical functions formed on a release sheet is transferred to a thermoplastic resin. That is, in Kanki et al., the durable gravure ink is transferred, while in the present invention, the three-

dimensional pattern is transferred.

(c) In Kanki et al., the base sheet *per se* does not have any pattern and thus the pattern of the base sheet is not used. In contrast, in the release sheet of the present invention, the release sheet *per se* has the three-dimensional pattern and it is repeatedly used to impart said pattern.

As stated above, Kanki et al. differs completely from the present invention in respect of object, construction and effects. Moreover, Kanki et al. also differs entirely from Kawaguchi et al. and Gray III et al. in every respect.

Therefore, it is not obvious to apply materials disclosed by Kanki et al. to the substrate in Kawaguchi and Gray III et al.

In summary, the present invention is novel and non-obvious over Kawaguchi et al., Gray III, et al. and Kanki et al., taken separately or in combination.

In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as amended, are in condition for allowance, which action, at an early date, is requested.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicants undersigned agent at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "**Version with markings to show changes made**."

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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23850
PATENT TRADEMARK OFFICE

Enclosures: Version with markings to show changes made
Declaration under 37 CFR 1.132

H:\FLOATERS\DAG\Amendments\010490.amendment filed 3-18-03

VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION

Please amend the paragraph beginning on page 12, 3 lines from the bottom, as follows:

Compared with this, in the case of a composite sheet, many suitable release sheets may be found. That is, as a substrate a synthetic resin film or sheet, a metallic foil, a cloth, a nonwoven fabric and paper are included. It is easy to wind a substrate in a form of cylinder of 12 inches or less in diameter, and it is easy to overlay a curable resin being capable of satisfying the thermal deformation temperature on a substrate into a composite layer. The substrate is required not to contract or deform in the following extrusion lamination of a thermoplastic resin and not to affect the formation of a three-dimensional pattern due to the ~~uneveness~~ unevenness on its surface, and a synthetic resin or a metallic foil is suitable.

Please amend the paragraph beginning on page 21, line 2, as follows:

As shown in Figure 2, each release sheet (2) of three kinds of release sheet (A), (B) and (C) obtained above, which were rolled into a cylindrical form with a diameter of 6 inches, was fed from a feeder (1) to the side of a press roll (rubber roll) (3) for pressing in an extrusion laminator (5) having a T-shaped die (screw diameter 40 mm, L/D = 22), and between the press roll (3) for pressing and a cooling metallic roll (4) having a random pattern of fine ~~uneveness~~ unevenness, a melted polycarbonate (6), "Panlite L1225ZE (trade name)" of Teijin Ltd., was extruded from the die in a coat hanger form, varying a resin temperature with two levels. Pressing pressure of the press roll was kept at 20 kg/cm^2 and a three-dimensional pattern was transferred on the polycarbonate sheet (6) at an operating speed of 10 m/min. The obtained resinous optical sheet (7) was bonded with a

protective film to protect its optical functions and wound by a winder (8) after the release sheet was removed.

Please amend Table 1 on page 25, as follows:

Table 1

Kind of release sheets (Apex angle 100°)			Thermoplastic release sheet (A)		Curable resin release sheet (B)		Composite release sheet (C)	
Evaluation of release sheets	Flexibility by a roll diameter		Windable practically at any diameter		Break at 6-inch diameter		Windable even at 3-inch diameter	
	Surface heat resistance test							
	Gloss before test (a)		92.7		314.0		335.0	
	Gloss after test (b)		72.6		331.0		330.0	
	Rate of change (%) *		21.7		5.4		1.5	
Evaluation of resinous optical sheets	Temp. of extruded resin (℃)		285	310	285	310	285	310
	Brightness of back ~~lite~~ light One sheet: Increase rate (fold) Two sheets: Increase rate (fold)		1.45 1.72	1.42 1.61	1.47 1.74	1.50 1.78	1.47 1.74	1.51 1.79
	Sectional configuration of a concavo-convex portion of prism	Straight portion of an inclined portion (%)	93	87	94	99	94	100
		Convex portion	Apex angle is curved.	Apex angle is indicated.	Apex angle is somewhat curved.	Apex angle is indicated.	Apex angle is somewhat curved.	Apex angle is clearly indicated.
		Concave portion	Sharp angle is indicated.	Greatly curved angle is indicated.	Sharp angle is indicated.	Sharp angle is indicated.	Sharp angle is indicated.	Sharp angle is clearly indicated.

* 〔(a) − (b) / (a)〕 × 100

Please amend Table 2 on page 27, as follows:

Table 2

Composite release sheet (D) (Apex angle 90°)				
Evaluation of release sheet	Flexibility by a roll diameter		Windable even at 3-inch diameter	
	Surface heat resistance test Gloss before test (a) Gloss after test (b) Rate of change (%) *		354.0 352.0 0.6	
Evaluation of resinous optical sheet	Temp. of extruded resin (℃)		285	310
	Brightness of back ~~lite~~ light One sheet: Increase rate (fold) Two sheets: Increase rate (fold)		1.52 1.86	1.56 1.92
	Sectional configuration of a concavo-convex portion of prism	Straight portion of an inclined portion (%)	94	100
		Convex portion	Apex angle is somewhat curved.	Apex angle is clearly indicated.
		Concave portion	Sharp angle is indicated.	Sharp angle is clearly indicated.

* [(a) − (b) / (a)] × 100

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Re Application of :

Fumiya TERAKADO et al

Serial No. : 09/842,803 Group Art Unit : 1733

Filed : April 4, 2001 Examiner : MUSSER, BARBARA J

For : METHOD FOR PRODUCING A CONTINUOUS SHEET HAVING OPTICAL FUNCTIONS

#5/Dec
3/28/03

DECLARATION

Honorable Commissioner of Patents
and Trademarks
Washington, D.C. 20231

Sir:

Takumi KOSUGI, a citizen of Japan residing at 4-8-14, Turukabuto, Nada-ku, Kobe-shi, Hyogo-ken, Japan, being duly sworn depose and says that:

1. I graduated from Bachelor Course of Applied Clemistry, Osaka University in 1957. I was employed by Kaneka Corporation on April 1, 1957. Since then, I have been engaged in research and development of polymer chemistry up to March, 1989, and have assumed the general manager of Research and Development of Polymer Division at Kaneka Corporation up to May 1994. On June 1, 1994, I was employed by Goyo Paper Working Company Limited. From June, 1994 up to today, I have been engaged in research and development of

opical prism sheets at Technical Development Division of Goyo Papar Working Company Limited. I have numerous patent applications and patents on the subjects.

2. I have studied and am fully familiar with this specification and claims, the cited references and the Office Action dated November 20, 2002.

3. In order to demonstrate the superiority of a continuous sheet having optical functions obtained from a continuous curable resin release sheet according to the present invention, the following experiments were carried out.

EXPERIMENTS

(A) Production of curable resin release sheets

Four kinds of curable resins which are a non-solvent type, less shrinkable by curing and UV-ray curable were selected from coefficient of elasticity and glass transition temperature of curable matters described on a catalogue of JSR Corporation, the same maker of the curable resin Desolite KZ 9699 used in Example 1 of the present invention.

Each of those curable resins was applied on the thermoplastic resin release sheet of poly (4-methylpentene-1), irradiated with UV-ray, then, the thermoplastic resin release sheet was removed to

thereby obtain four kinds of curable resin release sheets in the same manner as in Example 1 of the present invention.

Moreover, two kinds of composite curable resin release sheets consisting of the curable resin layer and a biaxially oriented polyethylene terephthalate substrate were obtained in the same manner as in Example 1 of the present invention.

(B) Production of resinous optical sheets

Six kinds of resinous optical sheets of polycarbonate were obtained in the same manner as in Example 1 of the present invention except that those were rolled into a cylindrical form with a diameter of 14 inches and that the temperature of the extruded resin was set at 310 ℃.

(C) Evaluation of the release sheets and the resinous optical sheets

The characteristics of the release sheets and the resinous optical sheets were evaluated in the same manner as in Example 1 of the present invention in respect of flexibility by the roll diameter, heat resistance test of a surface by a heat seal tester, brightness on a plane-emitting device, and sectional configuration of a prism. The results are shown in Table A.

Table A

Comparative Examples			1	2	3	4	5	6
Kind of release sheets			Curable resin release sheet	Curable resin release sheet	Curable resin release sheet	Curable resin release sheet	Composite release sheet	Composite release sheet
Kind of curable resins Product number Coefficient of elasticity (Mpa) Glass transition temperature (tan δ max @ 35Hz)			 9003 1320 65	 1400 2020 108	 5000 2060 120	 2500 8.8 50	 1400 2020 108	 5000 2060 120
Evaluation of release sheets	Flexibility by a roll diameter		Windable even at 3-inch diameter or less	Windable at 12-inch diameter but fine cracks at 10-inch diameter	Break at 12-inch diameter	Windable at 3-inch diameter or less	Windable at 8-inch diameter	Windable at 12-inch diameter but fine cracks at 10-inch diameter
	Surface heat resistance test Gloss before test (a) Gloss after test (b) Rate of change (%) *		 345 238 31.0	 325 308 5.2	 313 302 3.5	 285 142 50.2	 298 294 1.3	 295 290 1.6
Evaluation of resinous optical sheets	Temp. of extruded resin (℃)		310	310	310	310	310	310
	Brightness of back lite One sheet:Increase rate (fold) Two sheets:Increase rate (fold)		 1.35 1.56	 1.48 1.77	 1.43 1.65	 1.21 1.34	 1.52 1.84	 1.49 1.82
	Sectional configuration of a concavo-convex portion of prism	Straight portion of an inclined portion (%)	82	99	99	68	99	98
		Convex portion	Apex angle is curved.	Apex angle is indicated but fine cracks are slightly observed.	Apex angle is indicated but fine cracks are observed.	Apex angle is curved.	Apex angle is indicated. No cracks are observed.	Apex angle is indicated, but fine cracks are slightly observed.
		Concave portion	Sharp angle is indicated.	Sharp angle is indicated.	Sharp angle is indicated.	Curved angle is indicated.	Sharp angle is indicated. No cracks are observed.	Sharp angle is indicated. No fine cracks are observed.

* $[(a)-(b)/(a)] \times 100$

As apparent from Table A, in the case of a curable resin release sheet having a rate of change before and after surface heat resistance test exceeding 30 %, the apex ange of the convex portion is deformed when its pattern is transferred (Comp. Example 1), and if the curable resin release sheet is more insufficient in heat resistance (Comp. Example 4), the concave portion is also deformed.

Although the above problem is solved by increasing heat resistance, flexibility by a roll diameter becomes insufficient. In a case where it breaks at 12-inch diameter, the operation of transferring its pattern to a resinous optical sheet becomes difficult, and even when the pattern is transferred, cracks are also transferred to the apex portion of a prism of the resinous optical sheet so that scattering of light takes place to thereby give an adverse effect to a increase in brightness on a back light (Comp. Example 3). Even when 12-inch diameter is feasible, there is often a case where with 10-inch diameter fine cracks are observed by a microscope on the convex portion of the curable resin release sheet and those cracks are transferred to the convex portion of a prism of the resinous optical sheet (Comp. Example 2). Accordingly, the 12-inch diameter is a limit.

Meanwhile, in the case of a composite release sheet overlaid with a biaxially oriented polyethylene terephthalate sheet, the flexibility by a roll diameter is improved and the 12-inch diameter becomes feasible even with the curable resin being attended by fine cracks or even with the curable resin being broken in the case of a

single-layer curable resin release sheet (Comp. Examples 2 and 5, Comp. Examples 3 and 6). However, in this case as well, when fine cracks come to be observed with the 10-inch diameter, those cracks are transferred to the convex portion of a prism of the resinous optical sheet. Therefore, the 12-inch diameter is a limit, as menthoned above.

4. It is understood from the foregoings that the following tow requirements are critical to attain the objects of the present invention, i.e., enhancing a dagree of freedom of processing conditions and selection of thermoplastic resins to be used, and producing a release sheet having high performance optical functions efficiently;

(a) the release sheet satisfies that a change in a surface-glass of a layer on which the pattern is formed is not more than 30 % in pressing a hot plate heated to 160 ℃ under a force of 20 Kg/cm^2 for 3 seconds, and

(b) the release sheet may be wound in a form of cylinder of not more than 12 inches in diameter.

5. All statements made herein are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may

jeopardize the validity of the application or any patent issuing thereon.

Dated this 5th day of March, 2003

Takumi KOSUGI